

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY


(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 15 MAY 2006

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| Applicant's or agent's file reference BCS 04-5002 PCT | FOR FURTHER ACTION See Form PCT/PEA/416 | |
| International application No. PCT/EP2005/002449 | International filing date (<i>day/month/year</i>) 04.03.2005 | Priority date (<i>day/month/year</i>) 05.03.2004 |
| International Patent Classification (IPC) or national classification and IPC INV. C12N15/82 C12N15/29 A01H5/00 | | |
| Applicant BAYER CROPSCIENCE GMBH et al. | | |
| <p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 8 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> <i>sent to the applicant and to the International Bureau</i>) a total of sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> <i>(sent to the International Bureau only)</i> a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> | | |
| <p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input checked="" type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input checked="" type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input checked="" type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p> | | |
| Date of submission of the demand 21.12.2005 | Date of completion of this report 12.05.2006 | |
| Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 | Authorized officer Vollbach, S Telephone No. +49 89 2399-8715 | |



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Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
 - ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-96 as originally filed

Sequence listings part of the description, Pages

1-20 as originally filed

Claims, Numbers

1-34 as originally filed

Drawings, Sheets

1/6-6/6 as originally filed

☒ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
 - ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
 - ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

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Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. 13,19,20,21

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☒ no international search report has been established for the said claims Nos. 13,19,20,21

☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

the written form

☐ has not been furnished

☐ does not comply with the standard

the computer readable form

☐ has not been furnished

☐ does not comply with the standard

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.

☐ See separate sheet for further details

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Box No. IV Lack of unity of invention

1. ☐ In response to the invitation to restrict or pay additional fees, the applicant has:
 - ☐ restricted the claims.
 - ☐ paid additional fees.
 - ☐ paid additional fees under protest.
 - ☐ neither restricted nor paid additional fees.
2. ☒ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
 - ☐ complied with.
 - ☒ not complied with for the following reasons:
see separate sheet
4. Consequently, this report has been established in respect of the following parts of the international application:
 - ☐ all parts.
 - ☒ the parts relating to claims Nos. 25-34 .

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|-------------|
| Novelty (N) | Yes: Claims | 32 |
| | No: Claims | 25-31,33,34 |
| Inventive step (IS) | Yes: Claims | |
| | No: Claims | 25-34 |
| Industrial applicability (IA) | Yes: Claims | 25-34 |
| | No: Claims | |

2. Citations and explanations (Rule 70.7):

see separate sheet

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Box No. VI Certain documents cited

1. Certain published documents (Rule 70.10)
and / or
2. Non-written disclosures (Rule 70.9)
see separate sheet

Supplemental Box relating to Sequence Listing

Continuation of Box I, item 2:

1. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this report has been established on the basis of:
 - a. type of material:
 - ☒ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☒ in written format
 - ☒ in computer readable form
 - c. time of filing/furnishing:
 - ☒ contained in the international application as filed
 - ☒ filed together with the international application in computer readable form
 - ☐ furnished subsequently to this Authority for the purposes of search and/or examination
 - ☐ received by this Authority as an amendment on
2. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
3. Additional observations, if necessary:

Re Item III.

The search has been limited to the claims insofar as they refer to the nucleic acid sequences and the corresponding proteins depicted in SEQ ID Nos 1-4. The reasons are as follows:

Claims 1-12, 14-18,22-24:

On the basis of these claims a meaningful search cannot be carried out because the claimed subject-matter is defined merely by the arbitrary designation OK1. Such arbitrary designation render the scope of the claims unclear in the sense of Article 6 PCT. An examination on the basis of these claims is also not possible.

Claims 13,19,20 and 21: These claims relate to starches which are devoid of any suitable technical characterisation which would allow a search and examination i.e. a comparison with the prior art.

Re Item IV.

1. In principle the present application lacks unity because claims relating to SEQ ID Nos 1 and 2 are not connected by a common inventive concept with claims directed to SEQ ID Nos 3 and 4. In fact these sequences are 60% homology only. However, the applicant in the present phase will not be invited to pay additional fees and the search has been performed on both inventions. However, the applicant is made aware that a corresponding objection may be raised at a later stage of the procedure.

Re Item V.

1. Reference is made to the following document:

D1: KOETTING O ET AL: "Identification of a novel enzyme required for starch metabolism in Arabidopsis leaves. The phosphoglucan, water dikinase" PLANT PHYSIOLOGY, AMERICAN SOCIETY OF PLANT PHYSIOLOGISTS,

ROCKVILLE, MD, US, vol. 137, no. 1, January 2005 (2005-01), pages 242-252,
XP002339144 ISSN: 0032-0889

- D2: BAUNSGAARD L ET AL: "A novel isoform of glucan, water dikinase phosphorylates pre-phosphorylated alpha-glucans and is involved in starch degradation in Arabidopsis" PLANT JOURNAL, BLACKWELL SCIENCE, OXFORD, GB, vol. 41, no. 4, February 2005 (2005-02), pages 595-605, XP002339143 ISSN: 1365-313X
- D3: MIKKELSEN R ET AL: "Functional characterization of alpha-glucan, water dikinase, the starch phosphorylating enzyme" BIOCHEMICAL JOURNAL, THE BIOCHEMICAL SOCIETY, LONDON, GB, vol. 377, no. 2, 15 January 2004 (2004-01-15), pages 525-532, XP002339213 ISSN: 0264-6021
- D4: WO 02/10210 A (BAYER AKTIENGESELLSCHAFT; TIETJEN, KLAUS; WEIDLER, MARCUS) 7 February 2002 (2002-02-07)
- D5: WO 02/22675 A (SYNGENTA PARTICIPATIONS AG; UNIVERSITY OF NORTH CAROLINA AT CHAPEL HIL) 21 March 2002 (2002-03-21)
- D6: WO 02/34923 A (AVENTIS CROPS SCIENCE GMBH; BAYER CROPS SCIENCE GMBH) 2 May 2002 (2002-05-02)

1. Documents D1 and D2 are both intermediate documents which would destroy the novelty of the claims if the priority claim of the present application turns out to be invalid. However, since the priority document is not available, the present authority starts from the assumption that the priority claim is valid.

2. D3 discloses a functional characterisation of the protein encoded by the AtGWD3, which as shown in D2 is 99.8% identical to SEQ ID No. 2 of the present application. The functional analysis is performed by using the site directed metagenesis which require the sequence to be cloned in a suitable vector and transformed in host cells. In view of this disclosure claims insofar as they refer to SEQ ID Nos 1 and 2, i.e. claims 25-31 are not new. The same lack of novelty applies also for claims directed to the proteins i.e. claims 33 and 34 (Article 33(2) PCT).

The search regarding SEQ ID No. 3 and 4 revealed almost the same documents, however the sequence identity is only 60% to SEQ ID Nos 1 and 2. Therefore, the subject-matter

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relating to these SEQ ID Nos. are new in the sense of Article 33(2) PCT.

However, the disclosure of D6, which concerns the R1 protein and modified plants is considered relevant, because R1 is a functional equivalent of the enzyme according to the present application. Thus in view of this document present claims 33 and 34 lack novelty and present claims 25-32 cannot be regarded to involve an inventive step (Article 33(3) PCT), because the provision of an equivalent is inventive only when it has unexpected properties. Such properties are not recognizable.

3. It should be noted that claims 33 and 34 are not admissible under Article 6 PCT because the definition used in this claims is devoid of any technical characterisation. Instead only definitions by the substrate processed are used to define the enzymes of the inventions. This leads to an unclear scope of protection.